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Hoogewerff writes that the latter value of the longitude of Washington has not yet been adopted for use.

Captain Hoogewerff writes further that times of sending the 10 P. M. signals cannot be connected up with the Washington-Paris work very rigorously "on account of the different relay lags involved, that at Radio sometimes amount to about $0^s.01$."

The value $8^h\ 9^m\ 2^s.84$ agrees very well with that used here for several years past (*viz:* $8^h\ 9^m\ 2^s.82$) which was determined by connecting up with the U. S. Coast and Geodetic Survey Observatory in San Francisco.

Because of the uncertainty, mentioned by the Superintendent of the U. S. Naval Observatory, due to the possible relay lags, the value of the longitude of the Students' Orservatory heretofore used, *viz:* $8^h\ 9^m\ 2^s.82$, will be continued as the adopted mean value until further notice.

In this campaign the radio work was ably conducted by Messrs. R. B. Abbott of the Department of Physics, and H. F. Fisher and F. E. Pernot of the Department of Mechanical Engineering. The local time determinations were made by Messrs. R. T. Crawford, S. Einarsson, and S. B. Nicholson of the Berkeley Astronomical Department. The whole campaign was directed by Professor A. O. Leuschner, Director of the Students' Observatory.

R. T. CRAWFORD.

Berkeley Astronomical Department,
July 28, 1916.

ON THE ORBIT OF (132) AETHRA.

The minor planet *Aethra* was discovered by Watson in 1873. Watson observed it on six nights, and Borrelly, Coggia and Stephan of the Marseilles Observatory on seventeen consecutive nights until the fifth of July. Since then it has not been seen.

Widely differing orbits were published by Watson and later by Luther. The values of the mean daily motion for these range from 843″ to 980″. Luther's work included the computation of the orbit upon several assumptions of the mean motion. He computed ephemerides for several consecutive years and some search was made on the basis of them, but the results were negative.

In 1913 an object was photographed with the 40-inch reflector of the Lowell Observatory. Later this was suspected as *Aethra,* but unfortunately there was but the one observation.

In the fall of 1914 an investigation of the orbit was begun by the writer. The range of the mean daily motion within which a satisfactory representation could be obtained was very carefully investigated. It was found that any motion between eight and nine hundred seconds of arc represented so closely that, when the discrepancies of the observations were considered, there was an almost equal probability for any of the values. Indeed a much larger range was found to be possible.

An investigation of the Lowell observation showed that it could be represented closely by an orbit based on the 1873 observations, merely choosing that mean motion which best satisfied its right ascension. On the basis of this orbit an ephemeris was computed for the last opposition. Cloudy weather interfered with the search at the Lick Observatory and the writer does not know of any other being undertaken.

The above investigation was published as Number 275 of the *Lick Observatory Bulletins.* Since that time the work has been continued and has yielded one or two quite interesting results.

A slight error was found in the adopted value of the mean daily motion required to represent the 1913 observation. This error changed the value by only four one-hundredths of a second of arc. The new value represents the declination more closely than the one printed, thereby increasing the probability of identity, for when an orbit is obtained, as described above, the reciprocal of the δ-residual is a fair measure of the probability of the final observation being of the same object as those on which the orbit is based.

On the supposition of identity between *Aethra* and the object observed at the Lowell Observatory, it is found that the mean daily motion of *Aethra* differs less than four seconds from one-fourth that of the Earth. As a result of this near commensurability, oppositions at which the planet is near perihelion must occur at the same time of year during long periods of time. Perihelion is in that part of the orbit where the planet is far south of the ecliptic. In the case of *Aethra* both these conditions combine to cause the planet to be always far south of the equator when near perihelion. The great eccentricity of the orbit makes this a very serious matter for observers in the northern hemisphere. For such oppositions as last year, when the planet is far north, the nearness to aphelion causes it to be faint. When it is bright it is many degrees below the equator. This explains one of the facts that has puzzled those who have studied the orbit. How could a planet which becomes as bright as *Aethra* does at times miss accidental observation during a period of forty years? By explaining this circumstance it seems to the writer that the probability of identity is much increased.

An ephemeris has been computed for the coming opposition. On December 1st the declination will be —24° and the magnitude 10.6, which is brighter than it was at any time last year. February 1st it will be 41° south and will have a magnitude of 10.3. During March and the early part of April it will be about 45° south and have a magnitude of about 10.0. It then begins its return north, coming to opposition about May 1st, 42° south of the equator with a magnitude of 9.9. These magnitudes are based on the 1873 visual observations and, according to the Lowell observation, should be somewhat brighter.

It is worth while to note that the coming opposition is similar to those in 1873, when it was discovered, and in 1913 when it is assumed to have been reobserved. It will be very easy, especially for southern observatories, to make a search that will settle the question of identity. Northern observatories can best search for it in December, five months before it comes to opposition.

DINSMORE ALTER.

Students' Observatory,
University of California.
1916, July 20

DELICATE EARTH TREMORS.

On the night of August 18, 1916, a continuous series of tremors was noted, while attempting to observe over the nadir for level of the meridian circle. The tremors lasted